

Brown Bullhead

Ameiurus nebulosus (formerly *Ictalurus nebulosus*)

DESCRIPTION

The brown bullhead is a medium-sized member of the catfish family. It is considered a warm water fish and inhabits both fresh and brackish waters. It is an extremely hardy fish. The brown bullhead is easily identified by its distinctive barbells, thick rounded body, large somewhat flattened head, scaleless dark brown skin, mottled sides, cream-colored belly, square caudal fin, and sharp, saw-toothed spines at the base of the dorsal and pectoral fins.

BODY SIZE

Brown bullheads average 230 – 305 mm and rarely exceed 457 mm (Mugford 1969). A typical adult weighs approximately 454 g, but they may reach as much as 1,816 g (Scarola 1987).

In the Study Area: During the 2000 fish biomass survey in the primary study area, 142 brown bullheads were captured from reaches 5C, Woods Pond, and its associated backwaters. Table 1 shows the captures for each reach by size class. The length of brown bullheads captured ranged from 57 to 336 mm with a mean of 231.9 mm (SD = 75.9). The weights ranged from 3.2 to 496.5 g with a mean of 223.1 g (SD = 144.4).

Table 1. Brown bullhead captures from the primary study area in 2000

Reach	Size class					Total
	YOY	I	II	III	IV	
5C	0	0	1	2	10	13
Backwaters	0	1	2	1	28	32
Woods Pond	12	18	6	12	48	96
Total	12	19	9	15	86	141

Size classes (mm): YOY (Young of the Year) = <100, I = 101–150, II = 151–200, III = 201–250, IV = 251+ (adapted from Klarberg and Benson 1975)



Figure 1. Range of brown bullhead in North America

DISTRIBUTION

Brown bullheads are native to eastern and central North America from Nova Scotia and New Brunswick to the Great Lakes region and south to Alabama. They have also been introduced throughout the United States (McClane 1978). Figure 1 above shows their indigenous range in North America.

MIGRATION

Brown bullheads do not migrate seasonally or to breed. In northern portions of their range, they likely move to slightly deeper waters in which to hibernate (see below) and escape winter ice.

HABITAT

Brown bullheads are found in lakes, ponds, impoundments, and low-gradient streams, with shallow water and muddy bottoms. Brown bullheads are typically benthic dwellers and can tolerate lower oxygen levels and higher water temperatures (up to 31.6°C) than most other fish species (FishBase 2001). Brown bullheads survive low-oxygen conditions (i.e., levels as low as one part per

In The Primary Study Area: Numerous pairs of brown bullheads were observed spawning in Woods Pond and the backwaters north of Woods Pond during the late spring, in areas typically 1 – 2 feet deep and well-vegetated with aquatic plants.

GROWTH AND DEVELOPMENT

Eggs hatch in five days at 25°C, with incubation time increasing in colder waters. Larvae are 8.0 mm at the time of hatching. They have a large yoke sack, which is absorbed over the next five days. Larvae stay within the nest under the protection of the parents for their first week. After leaving the nest, larvae remain in dense schools until they reach approximately 50 mm. At that point schools break down and juveniles disperse. Table 3 illustrates growth rates for young of the year bullheads in Cayuga Lake, New York (Raney and Webster 1940).

Table 3. Growth of young-of-the-year brown bullheads from New York (Raney and Webster 1940)

Date Collected (1938)	n =	Total length (mm)	
		Range	Mean
21-June	100	13–16	15.2
30-June	97	16–25	20.9
8-July	100	20–31	26.8
15-July	65	23–38	31.6
16-July	100	28–44	36.9
5-August	63	35–48	42.0
30-September	27	45–79	57.5
10-October	53	41–93	68.0

FOOD HABITS AND DIET

Brown bullheads are opportunistic bottom feeders, consuming a variety of plant, animal, and detrital foods. They feed primarily at night and locate food by brushing their barbells, which are equipped with taste buds, along the bottom (Scarola 1987). Klarberg and Benson (1975) found that brown bullheads in a small impoundment of the

Tygart River in West Virginia consumed 54.2% plant material, 22.7% invertebrates, 21.9% detritus, and 1.1% fish. The same study found that brown bullheads in the Monongahela River consumed 36.1% sewage, 33.4% detritus, 18.8% invertebrates, 6.1% plants, and 5.6% fish. Common invertebrates consumed included midges, worms, copepods, beetles, caddisflies, and crayfish. Fish collected near sewage outfalls consumed large amounts of sewage and invertebrates associated with sewage.

Leeches, mollusks, fish eggs, and frogs are also common foods of adults. Juveniles (30 – 60 mm) are primarily carnivorous, and feed mostly on cladocerans, ostracods, amphipods, bugs, and mayflies, as well as eggs and larvae of other fish (FishBase 2001).

Brown bullheads prefer midge larvae (Chironomid) and scuds (*Hyalella* sp.) (Klarberg and Benson 1975, Kline and Wood 1996). Chironomid larvae made up only 2.9% of bottom-dwelling invertebrates in a West Virginia river, but made up 10.1% of the invertebrates eaten by brown bullheads (Klarberg and Benson 1975). Young-of-the-year (YOY) consume more Chironomid larvae (71%) than do adults (38%), while adults consume more scuds (44%) than do YOY (4%) (Kline and Wood 1996). Raney and Webster (1940) reported that young of the year consume mostly Cladocera (25.0%), Diptera (24.3%), and Ostracoda (20.5%).

Brown bullheads are able to digest and utilize filamentous algae and consume large amounts (as much as 60% of their diet) of this food source (Gunn *et al.* 1977). Table 4 shows the food volume and composition found in brown bullhead stomachs by size class as reported by Klarberg and Benson (1975).

ENERGETICS AND METABOLISM

Brown bullheads are reported to consume 12.7 times their body weight in food per year (FishBase 2001). The metabolic rate of fish is usually measured by their rate of respiration

(i.e., their rate of oxygen consumption). Figure 2 shows the oxygen consumption of brown bullheads at 20° C (FishBase 2001). More detailed information and additional sources can be obtained from the FishBase website.

Table 4. Average food volumes in brown bullhead stomachs (ml/100 fish) from polluted waters in Virginia, by fish size class (from Klarberg and Benson 1975).

Food Type	River			
	I (n=22)	II (n=21)	III (n=29)	IV (n=11)
Invertebrates	35	27	12	67
Fish	0	0	0	70
Plants	0	tr	tr	77
Detritus	30	33	38	164
Sewage	0	1	1	0

Food Type	Impoundment			
	I (n=2)	II (n=2)	III (n=4)	IV (n=34)
Invertebrates	6	336	2	18
Fish	30	0	0	0
Plants	0	tr	86	81
Detritus	2	0	14	35
Sewage	0	0	0	0

Size classes (mm): I = 101-150, II = 151-200, III = 201-250, IV = 251+

POPULATIONS AND DEMOGRAPHY

Survivorship: Survivorship likely varies widely by water body and region. Mean annual survival was estimated at 76% and rate of exploitation at 7% for a population of brown bullheads in Clear Lake, California, with 52% and 14%, respectively, in Folsom Lake, California (McCammon and LaFlaunce 1961, Rawstrom 1967, both as cited in Carlander 1969).

Age at Maturity and Life Span: Brown bullheads reach sexual maturity their third year and live up to 8 years (Scarola 1987).

Mortality: Predation, competition, food availability, parasites, and diseases all play a part in brown bullhead mortality. Because they are taken by anglers, the mortality rate of the adult fish would also be dependent on the extent of local or regional fishing pressure.

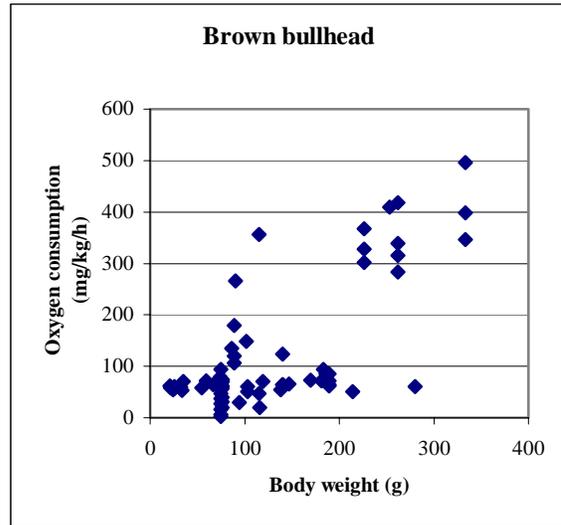


Figure 2. Metabolic rates of the brown bullhead as a function of oxygen consumption per body weight.

Enemies: Large game fish (i.e., bass, pike, pickerel, and perch), snapping turtles, water snakes, and wading birds are known to prey upon brown bullheads. Though anglers take these fish, populations are generally unexploited because of their nocturnal feeding habits. Parasitic trematodes, cestodes, copepods, and nematodes have been found in brown bullheads, though it is not clear to what extent they affect bullhead survival. The glochidia of mussels can be found in the gills, and leeches are common parasites (Adams and Hankinson 1926).

STATUS

General: The brown bullhead is common in northeast as well as on the Atlantic and Gulf slopes and is often abundant in suitable habitat (Page and Burr 1991). It has the potential to become overcrowded in certain water bodies, resulting in competition for space and food as well as undersized individuals. The overcrowding of bullheads can also negatively impact other fish species in the water body (Scarola 1987).

In The Study Area: Brown bullheads were observed and captured primarily in the lower portions of the study area from reach 5C south to Woods Pond. They breed in Woods Pond and the shallow backwaters north of Woods Pond. Figure 3 illustrates these locations.

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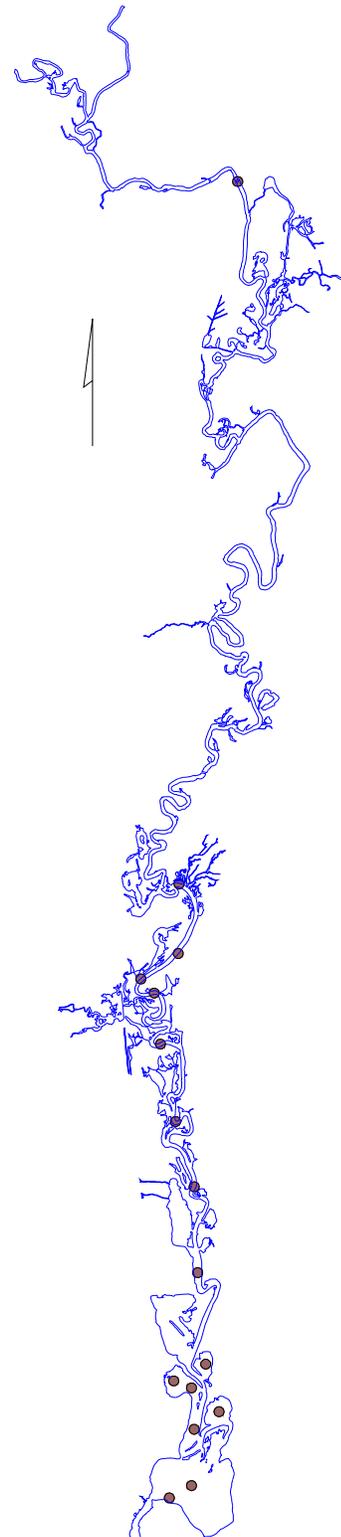


Figure 3. Brown bullhead sightings in the primary study area

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